Climate Change
Conservation Issues in the Asheville Field Office

Goose Creek, home to the Carolina heelsplitter, during drought

While much attention is paid to the impacts of climate change on coastal areas, especially regarding rising sea levels, or polar regions where ice caps are thinning, we expect to see significant inland impacts to fish and wildlife resources. The Asheville Field Office is extremely concerned with impacts to Southern Appalachian high-elevation communities, and wetland and stream communities, though impacts certainly won't be limited to these areas.

High-elevation, rocky outcrops are home to several protected species

The Southern Appalachian region is home to the highest peaks in the United States east of the Rocky Mountains. In fact, of the 40 peaks east of the Mississippi that are above 6000 feet, 39 are in the Southern Appalachians. During the last ice age, as ice sheets turned the northern latitudes into barren regions, the distribution of cold-weather plants and animals shifted south. Later, as temperatures warmed, these species moved back north to stay with cold temperatures. In the Southern Appalachians, these species also found homes in the cold, harsh climate found on the tops of the highest mountains. These areas are now home to some of the rarest natural communities in the country, which, in turn, are home to some of our rarest plant and animal species, many of which are found no where else in the world. Some are so rare and imperiled they're protected under the Endangered Species Act. Protected plants in these areas include spreading avens, Roan Mountain bluet, and Blue Ridge goldenrod. Protected animals here include the Carolina northern flying squirrel and the spruce-fir moss spider.

Because these peaks are so high and separated from areas of similar climate and habitat by hundreds of miles, they're often referred to as mountaintop islands. The rising temperatures expected with climate change are of particular concern with respect to these cold-dependent species. Already at the top of the mountains they can no longer move uphill to find refuge, and separated from similar habitats by such great distances they can't move across the landscape to find refuge.

Appalachian bogs are exceptionally rare, small wetlands that are home to numerous threatened or endangered species, including swamp pink, green pitcher plant, mountain sweet pitcher plant, and the bog turtle, North America's smallest turtle. These bogs depend entirely on specific moisture levels, something that climate change threatens to alter through erratic precipitation patterns.

Western North Carolina flooding

Likewise, changes in precipitation patterns could affect area streams either with droughts that leave stream beds dry (as recently seen in several North Carolina streams), or with flooding that erodes stream banks and bottoms, destroying habitat and increasing the severity of downstream sediment problems.

While these concerns are prominent, they aren't comprehensive. As we contemplate erratic weather patterns and general warming trends in the Southeast, other existing and possible impacts include changes in ambient cave temperatures affecting cave-dependent species; alterations of migratory bird habitat; shifts in migratory patterns of birds, fish, and other animals, such as the timing and

View from the shoulder of Mt. Mitchell, highest peak in the east

distance of migrations; and fluctuations in the seasonal behavior of plants, such as plants flowering before pollinators are present.

Clearly climate change is an issue of such magnitude that addressing it requires novel approaches and global coordination; however, the Asheville Field Office is engaged in activities to help ameliorate impacts on a local level. We are working with non-governmental organizations to help maintain "ark" populations of exceptionally rare species. The Atlanta and North Carolina Botanical Gardens maintain populations of some rare plants from high elevation and wetland habitats, such as spreading avens, Roan Mountain bluet, green pitcher plants, and mountain sweet pitcher plant. Conservation Fisheries, Inc. maintains in captivity some exceptionally rare fish. We realize that maintaining a handful of individuals in a garden, zoo, or aquarium is only a short-term, stop-gap measure designed to help hold the species over until enough suitable habitat is restored or protected in the wild. Keeping plants and animals in captivity is challenging, both in terms of determining appropriate care for the species, and protecting a species' genetic diversity.

The Asheville Field Office has long worked to protect wetland and stream habitat in ways that would increase stream stability during high-flow and help maintain flow during drought. We advocate the use of low-impact design which minimizes impervious surfaces in developments, allowing more precipitation to soak into the soil to be stored and slowly released into a stream or wetland. We advocate the protection of stream-side forests, which help hold stream banks in place. We continue providing technical and financial assistance to willing private landowners to help them protect streams and wetlands on their property.

In response to drought, we've worked with North Carolina State University and the North Carolina Wildlife Resource Commission to salvage rare mussels from streams with exceptionally low flow, housing them in hatchery facilities where they can be used in research and stored until stream conditions improve.

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